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August 1, 1968

Mr. Jim Judge
University of New Mexico
Department of Anthropology
Albuquerque, New Mexico

Dear Jim:

Thanks for your letter of July 21st and I am glad to know of your interest in lithic technology. May I also take this opportunity to say how much I enjoyed your paper at Santa Fe.

Your observation of the color change from the thermal treatment is very true and it is interesting to know that this technology was in practice at this site. My experiments show that the color change from yellow to red occurs only when oxygen is present and depending on the type of material being altered. Pieces buried too deeply in the sand during the heating do not permit the color change while the pieces left near the surface will alter the color. Depth of penetration of the color change depends on the length of heating time.

I am sending you some samples of yellow jasper which has been altered by heating. These were heated gradually to a maximum of 500 degrees F. and then cooled slowly to prevent fracturing.

Jim, it is impossible to thermal treat just a portion of a flake or artifact for any heat subjected to part of the material would be transmitted throughout. If only part of the stone were subjected to heat, then the part exposed would fracture. It just can't be done this way - it is nothing or all.

Without examining the actual material and only the photos as a guide, I would say that your specimens were derived from a large piece of altered material from which most of the original surface was removed which would account for only remnants of color present on the margins. This happens quite often in my experiments.

The treating of siliceous materials also causes a texture change. After alteration, the stone is more vitreous and glassy and, therefore, produces a keener and sharper edge. Alteration causes the micro crystals to reduce in size, the stone loses its original toughness and, therefore, is more elastic and easier to flake. It will be interesting to ultimately determine how far back in time the thermal treatment was used. Bordes is certain that it was used in Solutrean times.

I do wish that we could have had more time together at Santa Fe and hope that at the next meeting things will be different. Do hope that you plan to attend the Great Basin Conference at Pocatello the 29, 30 and 31st of August. If so, we can get together then. Please give my regards to Jerry Dawson if he has not gone to Dallas as yet and I do hope these few comments will be of some help. Plan to rewrite the thermal paper very soon.

Sincerely yours,

P.S. Let me know when I can help.

Don E. Crabtree

Ce. 5.5.64